

DEVELOPMENT OF A LONG-TERM PROCESS FOR
COLLECTION OF DOCTOR-PATIENT ENCOUNTER DATA IN
AN AMBULATORY CARE FACILITY

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THESIS

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IN AN AMBULATORY CARE FACILITY

by

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and

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September 1974

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T164088

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) DEVELOPMENT OF A LONG-TERM PROCESS FOR COLLECTION OF DOCTOR-PATIENT ENCOUNTER DATA IN AN AMBULATORY CARE FACILITY		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis; September 1974
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) STEPHEN J. PAEK JR. and MONTE M. PARRISH		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		12. REPORT DATE September 1974
		13. NUMBER OF PAGES 86
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Naval Postgraduate School Monterey, California 93940		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Primary Physician Care Baseline Family Practice Delivery System Encounter Quality of Care		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This thesis is a pilot effort in the development of a long-term process for collection of doctor-patient encounter data in an ambulatory care facility. The use of outpatient measures of effectiveness in the comparison of the quality of care delivered by two or more modes of ambulatory care is discussed. The delivery system from which the data was collected is described fully and data collection and processing procedures are explained in detail. Examples of		



UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

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Development of a Long-term Process for Collection
of Doctor-Patient
Encounter Data in an Ambulatory Care Facility.

by

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN OPERATIONS RESEARCH

from the
NAVAL POSTGRADUATE SCHOOL

September 1974

ABSTRACT

This thesis is a pilot effort in the developement of a long-term process for collection of doctor-patient encounter data in an ambulatory care facility. The use of outpatient measures of effectiveness in the comparison of the Quality of Care delivered by two or more modes of ambulatory care is discussed. The delivery system from which the data was collected is described fully and data collection and processing procedures are explained in detail. Examples of both utilization of data by the facility from which it was collected and in more general sense are given. While the data is not definitive due to both the relatively short sample period and the derivation from a single source, the authors believe the methodology to be useful and its potential to have been demonstrated. Recommendations for future work in this area are offered in the final section.

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I. INTRODUCTION

In 1972 congress failed to renew the general draft which provided the legal basis for induction of "persons qualified in needed medical, dental, or allied specialist categories" into the military service. This development had a significant impact on the military medical care program. With the draft in effect the services were assured the necessary professional skills to maintain the existing medical program. With the end of the draft recruitment of professional medical personnel became more difficult and critical shortages were foreseen.(1) In light of these events, it is appropriate to consider how the services might provide the same quality of care with fewer professional personnel. How would replacement of physicians by paramedical personnel affect the quality of care? Would paramedics be able to handle minor illnesses as well as more highly trained nurses and doctors thereby making the program operate more efficiently? Or would the loss of doctors cause an unavoidable decline in the quality of care? This thesis is a pilot effort to collect data for the purpose of comparing the quality of two or more alternative modes of care and for studying utilization patterns of a single mode of care. While the data is not definitive due to both the relatively short sample period and the derivation from a single source, the authors believe the methodology to be useful and its potential to have been demonstrated.

Part II describes Silas B. Hayes Army Hospital at Fort Ord California, the health care delivery system from which the data was collected. The two modes of care provided at Fort Ord are described. Part III discusses effectiveness measures to be used in comparing alternative modes of care. Data collection procedures and techniques are outlined in part IV. Parts V and VI discuss uses for the data both at Fort Ord and in a more general sense. Recommendations for

future work in this area are offered in Part VII.

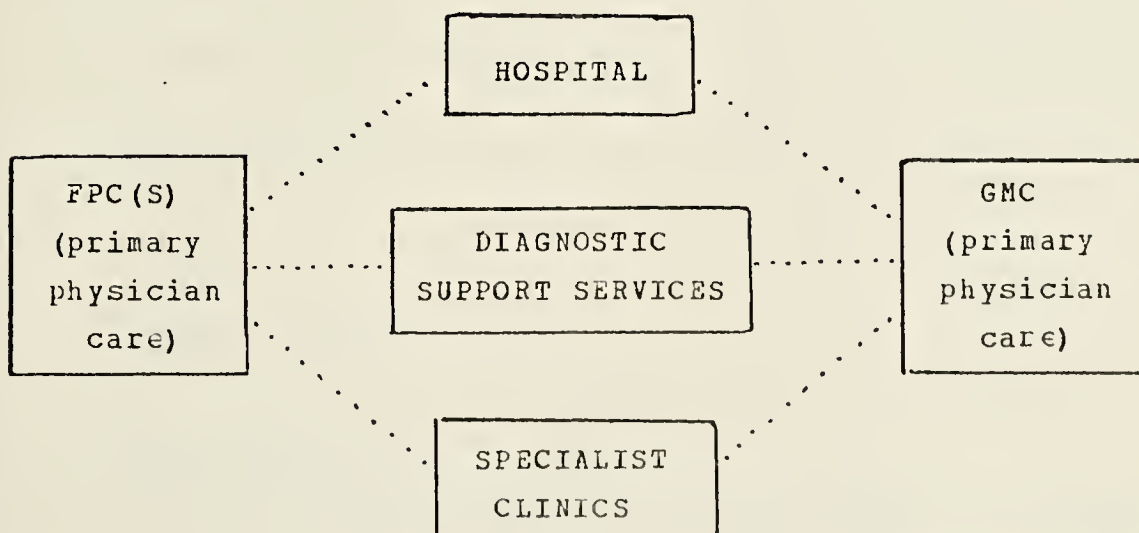
II. BACKGROUND

A. THE FORT ORD DELIVERY SYSTEM

1. General

In 1972 Silas B. Hayes Army Hospital (SBHAH) at Fort Ord, California was designated a participant in an experiment designed to evaluate the quality of various medical programs. The objective of the experiment was to put alternative outpatient or primary physician care modes into practice, identifying strengths and weaknesses, and thereby assisting the Surgeon General in deciding what form of medical program the armed forces should ultimately adopt. (2) Because of the participation in the experiment Fort Ord was simultaneously providing two distinctly different modes of medical care, One mode in Family Practice Clinics (FPC) and the other in the General Medical Clinic (GMC). Each of the programs provide general medical care to both retired and active duty military personnel in the Fort Ord area. The total population served is approximately 28,000 families or 85,000 individuals. The delivery system at the time of the study is represented in diagrammatic form below.

A VISUAL MODEL OF THE SBHAH DELIVERY SYSTEM



The reader should recognize that the only difference in the two modes is the form in which primary physician care is provided. Both modes use the same hospital, laboratory, and specialist clinics.

2.The Family Practice

The Family Practice program places participating families in the care of an assigned physician who provides all routine care. Under the preventative medicine aspect of the Family Practice, physicians have the additional responsibility of educating families in proper health care. In the case of extreme or unusual illness the patient is referred to the appropriate specialist clinic for treatment. This program has the higher physician-to-patient ratio of the two. Although there were two FPC'S at Fort Ord at the time, the focus would be upon the North Fort Ord Clinic (NFO).

Established at Fort Ord in 1972, NFO attempts to make the military medical care experience similar to that of a civilian community. The clinic is designed and staffed to serve approximately 1600 families or 6400 people. The staff consists of

4 General Practitioners

1 Nurse Clinician

2 Nurses

3 Medical aides

2 Receptionists

The clinic is open from 0800 to 1600 monday thru friday

for appointments or walk in cases of an urgent nature. After hours and weekend care is available at SBHAH on an emergency basis. Admittance to the Family Practice is tightly controlled with new requests for membership being considered periodically as military families are transferred from the Fort Ord area or as retiree families move from the area. Every attempt is made to keep conditions from becoming overcrowded.

3. The General Clinic

In the General Clinic, patient illnesses are assessed and categorized in the Acute Minor Illness Clinic (AMIC). This program relies heavily on paramedics who perform the initial categorization of patient illnesses with the paramedics treating the minor cases. In more serious cases the patient is seen by a duty physician who may treat the illness himself or refer the patient to one of the specialist clinics. Under this concept no attempt is made to establish a continuing doctor-patient relationship. no personal knowledge of patient medical history is available to the attending physician, nor is any formal attempt made to use preventive medicine. A person can request a physical exam, but no attempt is made for the routine scheduling of exams. (3) The unconfirmed opinion of the staff members is that over half of the people seen are treated by paramedics alone and released. The GMC is located in the main hospital building and has the same operating hours as NFO.

B• THE PURPOSE OF THIS THESIS

The purpose of this effort was to assist the Health Care Studies Unit in the collection and compilation of data, and to use that data which could be collected to provide

some quantitative basis for deciding which mode of care should be adopted. Further, it was felt that utilization patterns within one clinic could be studied by varying any one of the parameters that characterize that clinic, eg the appointment schedule or the preventative medicine policy. Since both the Family Practice and General Clinic serve comparable populations, it appeared that valid comparisons could be made. The ideal approach would be to establish two groups of families with similar characteristics. One would receive care from the general clinic, the other from the family practice clinic. Population characteristic data would be collected on each group to substantiate their similarity. Measures of effectiveness would be established and doctor-patient encounter data collected so that comparisons as to the quality or efficiency of care could be made. Unfortunately, as is discussed later, this ideal situation was unattainable.

Several alternative methods of data collection were considered, each entailing a different degree of difficulty: NFO administrative records could be checked for some utilization data; patient medical records could be screened for some encounter data; the most difficult method would be real time data collection of encounters on a day to day basis. Dissimilarities among types of data in medical records, incompleteness of medical as well as clinic records, and simple inability to read physician handwriting made the real time data collection the only feasible choice.

During the initial stages it became apparent that data collection was going to be a major undertaking. The sheer magnitude of the data collection effort was to be further complicated by certain unavoidable constraints at SBHAH. In the end it would be impossible to select groups similar in size and demographics for comparison because people could not be shifted from one medical care program simply for

convenience of the study. Several users within SBHAH had an interest in specific items of data, hence all data of interest - even that not within the scope of the study - would have to be included. Another stringent requirement of the hospital staff was that the collection should have a minimal effect on the daily routine of any clinic involved. Additionally, time was to be a significant factor. Design and approval of collection forms and writing and debugging of computer processing programs would have to be accomplished quickly to allow maximum time for data collection.

Several limitations of the study were apparent and should be enumerated. Data collection was limited to the primary physician care facilities. No data could be collected from the hospital or specialist clinics. If either of these entities acted differently upon Family Practice clinics than upon General Clinics the difference would probably go unnoted. This consideration could be significant in that the General Clinic with fewer professional personnel would tend to use the other facilities more than the FPC'S. Furthermore, any conclusion drawn would be forced to assume that the common components (specialist clinics, diagnostic services, and the hospital) would function in approximately the same manner with one mode of outpatient care in effect as they had with two.

The final and most critical difficulty arose when it was learned that encounter data from the General Clinic would be unavailable in the time frame of the thesis. As mentioned earlier, the present effort would ultimately be viewed as a pilot study in the collection of data for comparison of alternative types of outpatient care.

III. MEASURES OF EFFECTIVENESS

The problem of selection of appropriate measures of effectiveness to be used to compare the health care received by one group to that received by another proved to be one of the more interesting aspects of the study. In short quality of care is not an easy thing to measure.(4) Because baseline data had already been collected and encounter data was limited to that on approved encounter forms, MOE would be restricted to the available data. Several measures are suggested, but the list is not presumed to be complete.

Any discussion of MOE would be pointless without first stating the objectives of the system or organization. Objectives of the military medical care program might include but not be limited to the following.

1. Provide routine medical care and monitor the health of military personnel.

2. Maintain a training vehicle to insure the availability of medical resources in a national emergency.

3. Maintain the capability of providing medical care in remote areas.

4. Provide dependent medical care as a supplementary benefit to members of an all-volunteer armed force.

5. Accomplish 1 thru 4 above at a minimum cost.

For the purpose of this discussion of MOE, however the first objective of providing routine medical care and monitoring the health of service members was assumed. This is understood to include dependents and encompasses outpatient as well as hospital care. It should be

emphasized that the MOE which follow do not purport to measure the programs ability to achieve the other objectives. The general approach to the comparison of alternative types of care would be to establish "statistically similar" groups in the same locale and compare MOE values.

Quality Of Care is a general term and can mean different things to persons with different points of view. Newhouse asserts that quality of care comprises both the appropriateness of treatment and patient satisfaction. (5) It seems, however, that patient opinion could be misleading. For instance patients receiving care from an incompetent but very convincing physician may perceive that they are receiving high quality care when they are not. Those being seen by competent but impersonal physicians may receive better care than they think. Input MOE which are so commonly used in health care analysis today appear to take the hospital or administrator point of view. For instance a small number of patients per doctor, laboratory, or xray facility, or a short time in the waiting room may in the eyes of the administrator imply high quality care when in fact the technical quality of care is poor. Output MOE are less common because of the general unavailability of doctor-patient encounter data and lack of agreement on how it should be evaluated. The Fort Ord experiment, however, could provide a considerable amount of encounter data on a daily basis. The preferred approach would be to use output rather than input MOE in an attempt to measure quality of care in the most objective manner possible-to attempt to eliminate bias associated with a point of view. The MOE discussed below are output in nature in that they measure quantities which result from doctor-patient encounters.

Frequency of patient visits to the medical facility, measured in say number of visits per month is easily

obtained and can be used in direct comparison or to compare trends eg reduction or increase in frequency of visits between groups. Taken alone it tells one little, but if hospital admissions per patient visit were measured simultaneously, a significantly lower figure in both MOE in one group may indicate better care in that group. A low percentage of return visits in connection with a particular ailment may further strengthen such a contention.(6) A facility averaging a significantly higher number of return visits during a given flu epidemic may be less effective in the absence of a good explanation as to why the rate was higher. Since outpatient facilities all refer more serious cases to specialty clinics, the percentage of referrals per patient visit may be a good indicator of quality of care provided in that a significantly high number of referrals per visit may show that less actual care is being provided directly by the clinic concerned. A high percentage of referrals may be interpreted as a good indicator if there is reason to believe that they were made appropriately. A simultaneous look at length of visit may be helpful in that an encounter in which a referral occurs has often been a longer than average encounter.(7) The referral percentage MOE is a good example of one which can be very misleading when used alone. A higher proportion of referrals may be expected from the AMIC. If number of days spent in the hospital along with final diagnosis were collected, the general level of health in one control group might be compared to another. More hospital man days of admittance during a certain flu epidemic may be indicative of a lower resistance level. It would be expected that the Family Practice program would have the advantage of more complete personal history on patients and that duplication of xray requests, lab tests, EKG'S etc would be less prevalent. Collection of counts of such requests could be used to verify or refute such a claim.

The subject of how MD'S use their time appears to be pertinent both to the question of which form of outpatient care is better and to policies and procedures within one clinic. (8) The AMIC program attempts very little in the way of Preventitive Medicine. Since benefits derived from an effective preventitive medicine program are assumed to be long term in nature, a considerable amount of time may be needed to make meaningful comparisons. To summarize, the following MOE would appear to be pertinent in determining appropriateness of treatment.

1. Frequency and length of visit
2. Hospital admissions per patient visit
3. Percent of return visits
4. Percent referrals
5. Hospital admissions: final diagnosis and length of stay
6. Number of lab, EKG, and xray requests per visit
7. Amount of physician time spent in various tasks
8. Percentage of visits in which preventive medicine is conducted

The MOE mentioned above are only a partial list. If correctly weighted and interpreted, the authors feel they could be conclusive in establishing superiority among types of care or among facilities. The weighting and interpretation problem is considered to be beyond the scope of this effort, but it is crucial to the end result, and its

difficulty should not be underestimated. It would be very easy to come to false conclusions by using certain MOE while ignoring others.

Cost is another factor which has not been considered directly. At the very least a cost figure should accompany each alternative course of action eg one for a general clinic and one for a family practice clinic. Computation of the cost figures should account for the fact that the two are not mutually exclusive and presumably would use the diagnostic services and the specialty clinics to a different degree. It would also be possible to consider cost implicitly in MOE transformations, eg number of physician hours per quarter would be much lower for the AMIC simply because fewer physicians are used.

IV. DATA COLLECTION AND PROCESSING

A. GENERAL

Two distinct types of data are collected on patients enrolled in the NFO Family Practice Clinic. This data is referred to as

A. Baseline data

B. Encounter data

Baseline data consists of demographic information, and a brief medical history profile of each family. Baseline data is collected on a one time basis for each family enrolled in the program and stored for future reference. Encounter data is a physicians record of treatment on each patient seen. Collection of encounter data is a continuing real time data collection effort.

Each individual enrolled in the program is assigned a patient identification number (ID). This number consists of the sponsors social security number and a two digit prefix which identifies each member of a sponsor's family. This method of identification results in a unique eleven digit number for each member. The prefixes are

20 SPONSOR

40 MOTHER

30 SPOUSE

45 FATHER

50 MOTHER-IN-LAW

55 FATHER-IN-LAW

01 FIRST CHILD

02 SECOND CHILD

03 THIRD CHILD ETC

60 OTHER

B. BASELINE DATA

Prior to acceptance into the family practice program each prospective member is required to complete an application questionnaire (appendix A). The information supplied in this questionnaire provides the major portion of the baseline data bank maintained on each individual or family. Since these forms are gathered as families enter the program, they provide an accurate measure of the clinic population. Appendix A also contains a listing of the variables recorded on each family or individual in the program with appropriate numerical codes indicating response.

The data recorded on the Baseline form was transcribed directly onto data cards using an IBM 029 keypunch. Since the variables recorded on each member enrolled in the program is similar, the data was well suited to placement in fixed fields. In all 32 variables were recorded on each family enrolled in the program. The following list of items are punched in the following format.

ITEM	COLUMNS (inclusive)
SOCIAL SECURITY NUMBER	1-9
MARITAL STATUS	10
PAY GRADE	11-12
DOCTOR ASSIGNED	13-15
BRANCH OF SERVICE	16
SPONSORS BIRTH YEAR	17-18
SPONSORS SEX	19
MILITARY STATUS	20
NUMBER OF CHILDREN	21-22
NUMBER OTHER DEPENDENTS	23-24
CITY OF RESIDENCE	25-26
SPOUSES SEX	27

SPOUSES YEAR OF BIRTH	28-29
NUMBER OF DEPENDENTS IN FORT ORD AREA	30-31
SPONSORS RACE	32-33
SPONSORS RELIGION	34-35
SPONSORS EDUCATION	36-37
SPONSORS TOTAL MILITARY SERVICE	38-39
MILITARY CAREER	40-41
SPOUSES EDUCATION	42-43
SPOUSES RACE	44-45
SPOUSES RELIGION	46-47
SPONSORS USE OF ARMY CLINICS	48-49
SPOUSES USE OF ARMY CLINICS	50-51
CHILDRENS USE OF ARMY CLINICS	52-53
SPONSORS USE OF CIVILIAN FACILITIES	54-55
SPOUSES USE OF CIVILIAN FACILITIES	56-57
CHILDRENS USE OF CIVILIAN FACILITIES	58-59
CODE FOR OTHER DEPENDENT	60-61
SEX OF OTHER DEPENDENT	62
OTHER DEPENDENTS YEAR OF BIRTH	63-64
1ST CHILDS SEX	65
1ST CHILDS YEAR BIRTH	66-67
ETC	

C• ENCOUNTER DATA

Encounter data is collected on each patient seen by a doctor, nurse clinician, nurse, or medical aide (Health Care Provider). As stated earlier, encounter data collection is a continuing real time data collection effort.

Since 50 to 70 patients were being seen each day at NFO and because doctors must record a significant portion of the encounter data themselves, it was imperative that interference with routines of clinic personnel be held to a minimum. A second consideration was that of accuracy. Data

collected in a slipshod manner would be of little value. In the early stages of the effort it was learned that a working type document was already being filled out on each patient seen. The term "Working Document" here means that the form was used in the clinic for clerical purposes and was not solely an additional data collection form to be filled out. It seemed possible that a slight modification of the existing worksheet would be sufficient to get the desired data. No additional paper work would be added to the system, and a high degree of accuracy could be expected because the form was being used to communicate vital information among receptionist, doctor, and nurse. Use of this form also seemed to minimize the possibility of an unrecorded visit.

The encounter form used is included in appendix B. The form is filled out jointly by the receptionist and the Health Care Provider. The receptionist records the following items

1. Date
2. Patients Name
3. Patients ID Number
4. Appointment Status
5. Type Of Visit
6. Patients Complaint

The encounter form then accompanies the patient into the examining room where the physician fills out his portion of the form. This portion may have many or relatively few entries depending on the nature of the patient's problem. As a minimum the doctor enters his name, the length of

visit, and the problem on which the most time was spent. As is necessary he enters the problem on which the second most time was spent, length of visit (some doctors were unwilling to cooperate here), lab tests requested, immunizations, referral to specialty clinics, and future appointments desired. The patient then returns the encounter form to the receptionist who reviews it and redirects the patient as indicated by the physician.

To minimize the keypunching effort encounter data was punched on cards in a modified free format. Since the first nine items recorded on each encounter form are common to all encounter forms, it was easy to specify fixed fields for this portion. The first nine items were:

ITEM	COLUMNS (inclusive)
1. DATE OF ENCOUNTER (DAY-MO-YR)	1-6
2. PATIENT ID PREFIX	7-8
3. SPONSOR SOCIAL SEC NO	9-17
4. APPOINTMENT STATUS	18-19
5. TYPE OF VISIT	20-21
6. DOCTOR SEEN	22-24
7. MOST TIME ON PROBLEM	25-27
8. SECOND MOST TIME ON PROBLEM	28-30
9. LENGTH OF VISIT	31-33

Standard codes (included in Appendix B) were used to show omissions in items 4 through 9. The remaining data differed considerably from patient to patient. Obviously not all patients would receive the same treatments or the same number of treatments. One patient may receive no lab tests, while another may require five or six. This randomness in the number of treatments requested per patient visit precluded any type of fixed format on the remaining items

recorded. These items were keypunched beginning in column 34 in free format. No specific fields were set up for any of the treatments. The only means of identifying the treatment provided was through the use of a three digit number.

To facilitate identification treatments at the NFO clinic were broken down into four broad categories. Within each category there are many types of treatments. To distinguish among the treatments each one was assigned a three digit number. Blocks of three digit numbers were assigned to each category as follows:

CATEGORY	NUMBER BLOCK
PRESCRIPTIONS	220-229
XRAY	240-349
LAB TESTS	350-609
IMMUNIZATIONS	610-699
REFERRALS	700-800

This procedure provided a way of uniquely identifying both treatment and category. The number of prescriptions given a patient was signified by a three digit number between 221 and 229, the units digit indicating the number of prescriptions. The size of the encounter form limited the number of treatments which could be listed. If the treatment provided was not specifically listed the appropriate three digit number could be listed under "other".

Often a given treatment has no single universally accepted name and different physicians refer to the same treatment by different names. For example ALBUMIN SERUM test and AIGRATIO both refer to the same lab test. To preclude confusion and inaccuracy, a comprehensive list of

all treatments and names was made. Treatments that differed in name alone were assigned the same number. The ALBUMIN SERUM test and AIGRATIO were both assigned the number 377. The list of various treatments were then arranged alphabetically by category with their respective code number. This allowed an untrained individual to properly assign the codes to treatments requested regardless of name. A similar procedure was followed for xrays, lab tests, and immunizations. These lists are included in appendix B.

D. PROCESSING

The baseline data bank was extremely well suited to analysis using the Statistical Package For The Social Sciences (SPSS). (9) It was desirable to establish the initial distribution of baseline variables and define the type population in terms of summary statistics. These summary statistics were produced using the subprogram CODEBOOK in the SPSS library. Specifically subprogram CODEBOOK produced one way frequency distributions and in some cases descriptive statistics necessary to describe the distribution of each variable in the baseline data bank.

Before any attempt was made to effect interaction between Baseline and Encounter data it was necessary to make certain error checks. To the extent possible general routines from the W.R. Church computer center were used but in some cases original programs had to be written.

It was found that turbulence caused by additions to and departures from a given group would have to be dealt with. The NFO clinic had an average enrollment of about 1400 families. By gathering data on the entire population it would be possible to later limit the group to those individuals who had been in the program for the duration of the study. Patient ID numbers would be useful in isolating

that data which would ultimately be used.

Patient ID'S were used to insure that baseline data had been previously recorded on each person seen by a doctor or nurse. Obviously treatment of individuals who were not members of the Family Practice panels would distort utilization figures. This check was accomplished by comparing the patient ID numbers from the questionnaire against the patient ID numbers taken off the collected encounter forms. First the ID numbers of all patients enrolled in the NFO Clinic program were entered onto the data cell. These were then compared against the ID numbers from the encounter forms. If the number on the encounter form did not match with a properly enrolled patient ID the number was printed as an unauthorized patient. Initially this technique resulted in a rejection rate of approximately thirty percent of all encounter forms collected. Rejected patient numbers were checked and corrected. In many instances the sponsor or dependent ID from the baseline data was in error. A major reason was incorrect entry of social security numbers on the application questionnaire. Another source of error was incorrect dependent prefix. In some cases personnel assigned to the other family practice clinic were using the NFO clinic. Numerically ordered printouts of eligible ID numbers were furnished administrative personnel at NFO so that patient membership could be checked before treatment. This effort was continued for an eight week period and significantly reduced both errors and use of the clinic by persons not in the baseline control group.

To maintain the credibility of the encounter data it was necessary to ensure that it was obtained on every patient seen. To insure that this was being accomplished an independent check was performed. First, a monthly count of encounter forms was made. This total was then compared against a physical count of patients seen according to the

appointment schedule. For the month of April the appointment schedule reflected 1250 patients seen, and 1256 encounter forms were collected. Comparisons in other months were similar, attesting to the accuracy of the encounter recording procedure.

The only other routinely used programs were devoted to generating summary statistics of clinic utilization. The SPSS package was again extremely useful in generating summary statistics based on encounter data. SPSS requires fixed fields for all variables. Since all of the encounter data was not placed in fixed fields the encounter data had to be reformatted prior to use in the SPSS program. The encounter data was properly formatted and read into the data cell by a fortran program. The data was then recalled from the data cell by the SPSS program.

V. UTILIZATION OF DATA AT SBHAH

A. THE LABORATORY FEASIBILITY STUDY

One example of use of data collected at NFO was in connection with the question of whether or not to colocate a laboratory at the clinic, more specifically the number of personnel required. (10) A lab test the results of which are desired rapidly was defined as a convenience lab test for the purpose of the analysis. It was proposed that in order to reduce the time required to process convenience tests that a small, relatively inexpensive lab facility be colocated at the North Clinic. Tests could continue to be sent to the main hospital lab by courier (old slow method) in the event that the NFO Lab became overloaded. Questions to be answered were as follows

A. Which tests are used frequently?

B. Which tests could be performed at the clinic?

C. What are the arrival distributions for feasible tests?

D. What are the service time distributions for those tests?

E. What staffing alternatives can be proposed?

Operational questions A and B were answered by extracting from encounter data the total number of requests for each type of test over a given period and based on consultation with NFO physicians and the Chief Pathologist at SBHAH, eliminating those which were "obviously economically infeasible." Question D was treated by assuming that lab test times were Beta distributed and using PERT techniques to estimate the mean and variance of the

service times. Questions C and hence E were approached by constructing models and sub models which were poisson in distribution. The MOE selected for this analysis was Expected number of man hours per day required to perform tests.

Since encounter data included time of the encounter as well as the number and types of tests requested, the counting process approach seemed appropriate. Successful answering of questions A and B led to the selection of tests considered desirable to be performed at the clinic. The tests are listed below.

1. Complete Blood Count (CBC) and Differential.
2. CBC only
3. Urinalysis
4. Clean Catch Urinalysis
5. Throat Culture

The Chi Square goodness of fit test was used to test the hypothesis of Exponential inter event times, and all lab tests passed at the .05 level of significance. The runs test gave no basis for rejecting the hypothesis of time independence, so the arrival process for each test could be modeled as a homogenous Poisson Process. The maximum liklihood estimator was used to estimate the Exp. parameter. Total time models were then of the Compound Poisson Process form.

$$X(t) = Y_{11} + Y_{12} + \dots + y_{1N}(t)$$

Where

$X(t)$ is the total time required to perform a given test in hours per day

Y_{11} is the number of hours required to perform the first test of that type, Y_{12} the number of hours required to perform the second etc

$N(t)$ is a Poisson Process.

Total time for all tests is obtained by summing the Compound Processess models. The resulting 12.57 man hours per day led to a basic recommendation that two lab technicians be employed. A weak assumption that service times are Normally distributed led to the following alternatives for the decision maker.

Use two technicians with proportion of tests sent to main hospital = .43

Use three technicians with proportion of tests sent to main hospital = .03

This analysis shows how a small portion of the data collected was used to make recommendations as to staffing requirements at a proposed NFO convenience medical laboratory.

B. STATISTICS PROVIDED TO HOSPITAL ADMINISTRATORS

Monthly summaries of encounter data were furnished to NFO administrators for their own use. Table printouts included Number of Encounters per Day, Appointment Status (emergency, walk in, or appointment), Number of Patients seen in the month by each Doctor, Resident, nurse or medical corpsman, Patient problem requiring the most time, the second most time, Length of visit, and number of Rx's

prescribed for each encounter. Computer output for length of patient visit is shown below.

LENGTH OF PATIENT VISIT (NFO) (%)

0 to 5 minutes	2.1
5 to 20 minutes	72.5
20 to 40 minutes	15.7
over 40 minutes	3.0

Computer output for Doctor Seen is shown below.

DOCTOR SEEN (NFO) (%)

Doctor 1	29.7
Doctor 2	22.6
Doctor 3	15.0
Doctor 4	19.2
Nurse 1	11.5
Nurse 2	1.0

These summaries were used to monitor both the operation of the clinic and the performance of residents.

VI. GENERAL USES OF BASELINE AND ENCOUNTER DATA

A. COMPARISON WITH SELECTED KAISER DATA

Storage of baseline and encounter data on the data cell and utilization of the SPSS package made possible presentation of numerous data summarizations. Comparisons could easily be made between the NFO sample and another group under study. Baseline comparisons are typified by the following table which compares racial distributions at NFO with those of the Oregon Region of the Kaiser Foundation Health Plan. (11)

DISTRIBUTION BY RACE, KAISER AND NFO SAMPLES (%)

	Kaiser	NFO
Caucasian	97	72.9
Negro	3	15.3
Japanese		6.2
Other		2.4

Encounter data could also be compared as is typified by the table on the following page. The fact that Kaiser does not distinguish between appointment and walk in, and that NFO does not record phone calls illustrates the difficulty in comparing data which has not been specifically collected for comparison. The validity of any comparison of this type is severely weakened by the dissimilarity of categories.

VISIT TYPES, KAISER AND NFO SAMPLES (%)

	Kaiser	NFO
Appointments	68	90.3
Walk in		7.4
Telephone	24	
Emergency	5	2.3
Other	3	

B. SELECTED ENCOUNTER DATA

The following tables summarize selected NFO encounter data for the four month period over which the data was collected. "Other" used in conjunction with doctors A, B, C, and D means that the patient was treated by a Nurse Clinician, Nurse, or Corpsman.

	NUMBER OF PATIENTS SEEN				
	JAN	FEB	MAR	APR	TOTAL
DOCTOR A	339	315	342	345	1341
DOCTOR B	226	252	284	262	1024
DOCTOR C	279	199	290	174	942
DOCTOR D	229	170	256	223	878
OTHER	102	128	148	149	527
TOTAL	1175	1064	1320	1153	4712

The output of individual doctors, the monthly variation in output, and the proportional contribution of paramedics is more clearly portrayed by the following table which shows the number of patients seen per working day by each provider. Working days are assumed to be of equal length.

These numbers were adjusted to account for doctor days off where applicable. Implicit in any inference of output from this table is the assumption that all doctors saw patients of comparable complexity of treatment. No evidence has been seen to dispute the validity of such an assumption. The policy of random assignment of patients to doctor panels seems to support it.

NUMBER OF PATIENTS SEEN PER WORKING DAY

	JAN	FEB	MAR	APR	TOTAL
DOCTOR A	17.8	16.6	16.3	18.2	17.3
DOCTOR B	11.8	13.3	13.5	12.5	12.8
DOCTOR C	14.7	12.4	13.8	12.4	13.3
DOCTOR D	12.1	8.9	12.2	11.2	11.1
OTHER	5.4	6.7	7.1	6.8	6.5
TOTAL	61.8	57.9	62.9	61.1	60.9

Two caveats should accompany the following table showing the number of prescriptions given per patient seen. First, some patients received more than one and others received none, so the numbers are averages. Secondly, those items prescribed by paramedics in the other category were for the most part available off the shelf in any drug store, eg decongestant, cough syrup, and aspirin.

NUMBER OF PRESCRIPTIONS PER PATIENT SEEN

	JAN	FEB	MAR	APR	TOTAL
DOCTOR A	.94	.98	1.06	1.01	.98
DOCTOR B	.62	.72	.86	1.01	.81
DOCTOR C	.77	.99	.98	.88	.90
DOCTOR D	.60	.69	.67	.76	.68
OTHER	.62	.21	.62	.66	.53
TOTAL	.74	.78	.88	.89	.82

A partial feel for preventive medicine employed can be seen in the following table showing the number of immunizations given. The low numbers for doctor C are believed to be the result of recording omissions on the part of the doctor rather than a low number of immunizations.

NUMBER OF IMMUNIZATIONS					
	JAN	FEB	MAR	APR	% IMMUNIZED
DOCTOR A	46	50	43	56	15
DOCTOR B	37	17	28	39	12
DOCTOR C	17	2	10	2	3
DOCTOR D	35	37	33	37	16
% IMMUNIZED	12	10	09	12	10

Since military physicians are not under the pressure of rising frequency of medical malpractice suits as are their civilian counterparts, it is conjectured that the number of lab requests per patient and the number of xrays per patient in a civilian outpatient clinic would be significantly higher. Similarly, a comparison of immunizations per patient seen might be interpreted as one measure of the extent to which preventitive medicine was being practiced. Differences between individual Doctors can also be observed, the more experienced MD's generally requesting fewer of both.

NUMBER OF XRAYS					
	JAN	FEB	MAR	APR	% XRAYED
DOCTOR A	26	30	29	13	7
DOCTOR B	27	15	21	21	8
DOCTOR C	9	7	10	7	4
DOCTOR D	9	16	31	21	9
% XRAYED	6	6	7	5	6

NUMBER OF LAB TESTS REQUESTED

	JAN	FEB	MAR	APR	% TESTED
DOCTOR A	135	99	134	115	35
DOCTOR B	194	175	275	202	83
DOCTOR C	170	69	114	50	43
DOCTOR D	224	148	214	181	87
% TESTED	62	46	56	48	53

In that referrals to specialist clinics may give an indication of the completeness with which an ambulatory care mode deals with patients, the percentage of patients referred was tabulated below. As has been mentioned in the section on Measures of Effectiveness, the referral rate may be very inconclusive when used alone.

NUMBER OF PATIENTS REFERRED

	JAN	FEB	MAR	APR	% REFERRED
DOCTOR A	18	13	15	21	5
DOCTOR B	13	7	12	8	4
DOCTOR C	6	7	11	4	3
DOCTOR D	16	2	7	11	4
% REFERRED	5	3	3	4	3.6

The extent to which preventative medicine is being practiced can be addressed more completely by classifying treatments as preventative in nature or as non-preventative. See appendix for treatments as they appear on encounter

forms. The classification was effected as follows.

NON-PREVENTITIVE TREATMENTS

- 160 Acute injury
- 161 Acute injury followup
- 162 Acute (temporary) problem
- 163 Acute (temporary) problem followup
- 164 Chronic problem, routine
- 165 Chronic problem, flareup

PREVENTITIVE TREATMENTS

- 166 Prenatal and postnatal care
- 167 Partial exam
- 168 Complete history and physical
- 169 Family planning and contraception
- 170 Counseling, advice
- 171 Immunizations

The following table is based upon the above classification.

NUMBER OF PREVENTITIVE MEDICINE ENCOUNTERS

	JAN	FEB	MAR	APR	% P M
DOCTOR A	85	77	90	96	26
DOCTOR E	64	87	96	96	33
DOCTOR C	75	41	86	60	28
DOCTOR D	66	49	73	63	29
OTHER	75	106	120	79	72
% P M	31	34	35	34	34

This data shows that nurses and medical corpsmen are performing a significant portion (about 24 %) of the

preventitive medicine encounters, and about 4.7 % of the non-preventitive encounters.

VII. CONCLUSIONS AND RECOMMENDATIONS

The major thrust of this thesis has been to develop a long term collection procedure designed for study of utilization patterns in an effort to assist the Health Care Studies Unit at SBHAH compare and evaluate two alternative modes of primary physician care. At the conclusion of the effort the authors feel that certain comments are in order.

Operational limitations must be dealt with to some extent in any data collection effort, and collection of encounter data at the NFO clinic certainly was no exception. The problem of collecting a large amount of data, which must be accurate to be useful and at the same time minimizing the effect of the collection process on the clinic staff was solved through the use of a working type document. The document was designed to be a part of the daily clinic routine thereby abating the negativeness associated with filling out unnecessary forms. Additionally, it was a relatively inexpensive way to collect data in that it required no additional personnel in the clinic.

As the collection progressed it became evident that additional information if available would have more fully described the clinic operation. It is felt that these items could be added to the existing encounter form without causing undue hardship on the clinic staff. Patient arrival times are necessary for any time study, and since it is a simple matter for a receptionist to note the time of patient arrival, it is felt that this item could be easily added. Additionally, the length of time doctors spend with patients should be recorded in finer increments than those provided for on the encounter form. Far too many visits fall in the 5-20 minute category. Another item which is pertinent is final patient disposition - more specifically whether or not a patient was hospitalized or not. This would have been a

simple item to add to existing encounter form thus eliminating the necessity for checking social security numbers at the SBHAH registrar's office. Since hospitalization for routine childbirth has little to do with clinic effectiveness, it appears that admission for childbirth should be distinguished from admission for other reasons. One possible problem exists in using encounter forms to record hospital admissions in that a person could be admitted to the hospital without going to the clinic. This would be likely to occur when patients are seen after hours or on weekends. It is felt, however, that these admissions would be a small minority, and that they could be dealt with on an individual basis.

Return visits for the same problem are an item of interest in many health care studies, and the encounter data collection procedure does not provide for positive delineation of these visits. It is envisioned that this item could be entered by a receptionist at the beginning of a visit by simply asking if the patient was returning for treatment of an ailment which had been treated recently.

Use of physician time is a subject which could be addressed more completely by the data collection form. Rosenthal (12) divides physician time into three main areas - patient contact, patient related activities and overhead or non-patient related administrative time. The NFO encounter form records patient contact time but allows for no distinction between patient related and overhead time. Addition of patient related time to the form would give enough information so that all three could be delineated. This information would allow analysts to determine the effect of system structure on the use of physician time, ie how does the NFO physician use his time in comparison to the GMC physician? More pertinently, do differences in the structure of the two modes affect physician activity? (13)

Other parameters within NFO could also be varied to see if improved use of time would result, eg the appointment schedule or the number of nurses or paramedics available. Addition of this item would cause the largest imposition of any because physicians would have to record the amount of time spent on a patient's case which was not direct contact time. It should be realized that the number of items required to be recorded will most likely be inversely related to the accuracy with which the recording is done - especially in view of the long term nature of the collection effort. Both hospital administrators and analysts will have to be aware of this trade-off.

Finally, the data collection effort seemed incomplete without inclusion of encounter data from specialist clinics. Since each clinic is markedly different an encounter form would presumably have to be tailored to each.

Further research and experimentation is certainly in order in the area of Measures of Effectiveness. Certain measures of quality of care were proposed - others should be investigated and validated. Once this vector of MOE has been established, the question of how they should be weighted remains.

As the study of utilization of an outpatient care facility progresses one would expect that certain ailments would begin to emerge as standard or typical. Seasonal effects may be present, but such things as the flu, sore throats, minor cuts and bruises, and the common cold will be seen again and again. If a categorization could be made and a more definitive label put on encounters, the physician time spent on various complaints could be compared from clinic to clinic. It would also be possible to get a better grasp on what nurses and medical aides in a clinic are doing with their time. We know that they conduct almost 5% of the

non-preventitive medicine encounters, but specifically which ones are they? Could these people be seeing more patients? Could paramedics be utilized in the Family Practice clinics?

In conclusion the authors feel that other alternative modes of primary physician care should be considered. The Family Practice and the General Clinic with its Acute Minor Illness concept are on opposite ends of the spectrum with respect to the use of paramedics. In view of the economies associated with the Group Practice, the use of more paramedics and fewer physicians in the Family Practice clinics may prove to be a viable alternative. With a continuing encounter data collection and evaluation effort, its effects on productivity could be addressed.

APPENDIX A

This appendix contains the two forms used in the collection of Baseline data. the first form is the questionnaire completed by each member of the North Fort Ord Family Practice Clinic as a requirement for membership (pp 43 - 52 this thesis). The second form is the coding sheet used to transfer the questionnaire information to data cards (pp 53 - 54 this thesis).

FAMILY PRACTICE SERVICE
U.S. ARMY MEDICAL DEPARTMENT ACTIVITY (MEDDAC) FORT ORD
FORT ORD, CALIFORNIA 93941

YOU MAY OR MAY NOT HAVE BEEN SATISFIED WITH OUTPATIENT ARMY HEALTH CARE. THIS QUESTIONNAIRE CAN BE YOUR MEANS TO INFORM US HOW WE CAN IMPROVE YOUR MEDICAL CARE AND YOUR SATISFACTION WITH IT. YOUR COOPERATION WILL BE SINCERELY APPRECIATED.

THE INFORMATION YOU GIVE WILL BE TREATED AS "MEDICAL CONFIDENTIAL"; IT WILL NOT BE AVAILABLE TO ANYONE EXCEPT THOSE WHO ARE INTERESTED IN PROVIDING BETTER MEDICAL CARE FOR YOU AND YOUR FAMILY.

PLEASE RETURN THE COMPLETED QUESTIONNAIRE BY: _____
YOU MAY USE THE ENCLOSED ENVELOPE OR BRING IT PERSONALLY TO:

PLEASE RETURN THIS COMPLETED QUESTIONNAIRE BY THE DATE
INDICATED ABOVE OR WE WILL ASSUME THAT YOU ARE NO LONGER
INTERESTED IN PARTICIPATING IN THE FAMILY PRACTICE PROGRAM.

SPONSOR INFORMATION

Today's Date _____

Sponsor's Name: _____ SSAN _____
Last First MI

Present Marital Status: Never Married _____ Married _____ Divorced _____
Widowed _____ Separated _____

Pay Grade (circle one): E-1 E-2 E-3 E-4 E-5 E-6 E-7 E-8 E-9

WO-1 CWO-2 CWO-3 CWO-4

O-1 O-2 O-3 O-4 O-5 O-6 O-7 O-8 O-9

Branch of Service (circle one): USA USN USAF USMC USCG Other

Sponsor's Date of Birth: _____ Sex _____ Status: Active _____ Retired _____ Dec _____
Day/Month/Year

Number of Eligible Spouse _____ If family is living in the Ft Ord area, including
Dependents: Children _____ cities on the Peninsula, what is the estimated
Other _____ date of departure?
Departure Date _____

Duty or Business Address _____ Phone _____

Home Address _____ Phone _____

FAMILY INFORMATION

Spouse's Name: _____ Living in Ft Ord area (including
Last First MI cities on the Peninsula)?
Yes _____ No _____

Sex: _____ Date of Birth(DOB): _____
Day/Month/Year

Children's Names(oldest to youngest): SPECIFY LAST NAME IF DIFFERENT FROM PARENTS

First MI Living in Ft Ord area? _____ Sex _____ DOB _____
(including cities on peninsula) Day/Month/Year

Living in Ft Ord area? _____ Sex _____ DOB _____
(including cities on peninsula) Day/Month/Year

Living in Ft Ord area? _____ Sex _____ DOB _____
(including cities on peninsula) Day/Month/Year

Living in Ft Ord area? _____ Sex _____ DOB _____
(including cities on peninsula) Day/Month/Year

Living in Ft Ord area? _____ Sex _____ DOB _____
(including cities on peninsula) Day/Month/Year

(USE REVERSE SIDE IF NECESSARY)

OTHER ELIGIBLE DEPENDENTS:

Name	Relationship	Living in Ft Ord area? (Including cities on Peninsula) (Sex	DOB Day/Mo/Yr

Name	Relationship	Living in Ft Ord area? (Including cities on Peninsula)	Sex	DOB Day/Mo/Yr

THE FOLLOWING INFORMATION WILL BE USED ONLY TO DESCRIBE THE POPULATION SERVED
AND TO GET YOUR VIEWS TO ADD IN OUR PLANNING TO BETTER SERVE YOUR HEALTH CARE NEEDS.

NOTE: THE FOLLOWING INFORMATION PERTAINS TO THE SPONSOR.

- Sponsor's race or ethnic group:
 - ☐ White (Caucasian)
 - ☐ Black
 - ☐ Mexican-American
 - ☐ Puerto Rican
 - ☐ American Indian
 - ☐ Chinese American
 - ☐ Japanese American
 - ☐ Not Above; Please Specify _____
- Sponsor's religious preference:
 - ☐ Protestant
 - ☐ Catholic
 - ☐ Jewish
 - ☐ Not Above; Please Specify _____
 - ☐ None
- What is the highest level of formal civilian education the sponsor has completed?
 - ☐ Eight years or less
 - ☐ Some high school but did not graduate
 - ☐ High school graduate
 - ☐ Two years college or less with no degree
 - ☐ Associate Degree
 - ☐ More than two years college but no degree
 - ☐ Bachelors Degree (other than LLB)
 - ☐ LLB, JD, or equivalent
 - ☐ Masters Degree
 - ☐ Earned Doctorate (PhD, MD, etc.)

4. How long has Sponsor been at Ft Ord this tour?

☐ 0-2 months ☐ 9-11 months ☐ 18-20 months ☐ 27-30 months
☐ 3-5 Months ☐ 12-14 months ☐ 21-23 months ☐ More than 30 months
☐ 6-8 months ☐ 15-17 months ☐ 24-26 months

5.

5. How many years of total active federal military service has sponsor completed?

☐ Less than 6 months
☐ At least 6 months but less than 2 years
☐ At least 2 years but less than 4 years
☐ At least 4 years but less than 8 years
☐ At least 8 years but less than 12 years
☐ At least 12 years but less than 16 years
☐ At least 16 years but less than 20 years
☐ At least 20 years

6. Does the sponsor intend to make the military a career?

☐ Definitely No
☐ Probably No
☐ Undecided
☐ Probably Yes
☐ Definitely Yes
☐ Not Applicable (Retired, Deceased, etc.)

7. S

IF YOU DO NOT HAVE A SPOUSE AT THE PRESENT TIME

SKIP THE NEXT PAGE (Page 4)

NOTE: THIS PAGE PERTAINS ONLY TO THE SPOUSE. IF YOU ARE NOT MARRIED GO TO PAGE 5

7. Spouse's age:

<input type="checkbox"/> Less than 20 years old	<input type="checkbox"/> 40-44 years old
<input type="checkbox"/> 20-24 years old	<input type="checkbox"/> 45-49 years old
<input type="checkbox"/> 25-29 years old	<input type="checkbox"/> 50-54 years old
<input type="checkbox"/> 30-34 years old	<input type="checkbox"/> 55 years or more
<input type="checkbox"/> 35-39 years old	

8. Highest level of formal civilian education spouse has completed:

☐ Eight years or less

☐ Some high school but did not graduate

☐ High school graduate

☐ Two years of college or less with no degree

☐ Associate Degree

☐ More than two years of college but no degree

☐ Bachelors Degree (other than LLB)

☐ LLB, JD or equivalent

☐ Masters Degree

☐ Earned Doctorate (PhD, MD, etc.)

9. Spouse's race or ethnic group:

☐ White (Caucasian)

☐ Black

☐ Mexican-American

☐ Puerto Rican

☐ American Indian

☐ Chinese American

☐ Japanese American

☐ Not Above; Please
Specify _____

10. Spouse's religious preference:

☐ Protestant

☐ Catholic

☐ Jewish

☐ Not Above; Please
Specify _____

☐ None

ARMY MEDICAL CLINIC UTILIZATION

11. Sponsor's utilization of Army Clinics for out patient care during the past 12 months. (Other than routine physical exams and immunizations):

<input type="checkbox"/> Never during the past year	<input type="checkbox"/> 4 times	<input type="checkbox"/> More than 19 times
<input type="checkbox"/> Once	<input type="checkbox"/> 5-9 times	
<input type="checkbox"/> Twice	<input type="checkbox"/> 10-14 times	
<input type="checkbox"/> 3 times	<input type="checkbox"/> 15-19 times	

12. Spouse's utilization of Army Clinics for outpatient care during the past 12 months. (Include all visits for any purpose):

<input type="checkbox"/> Never during the past year	<input type="checkbox"/> 5-9 times
<input type="checkbox"/> Once	<input type="checkbox"/> 10-14 times
<input type="checkbox"/> Twice	<input type="checkbox"/> 15-19 times
<input type="checkbox"/> 3 times	<input type="checkbox"/> More than 19 times
<input type="checkbox"/> 4 times	<input type="checkbox"/> Not Applicable; I have no spouse

13. Eligible children's combined total number of visits to Army Clinics for outpatient care during the past 12 months. (Include all visits for any purpose)

<input type="checkbox"/> Never during the past year
<input type="checkbox"/> Once
<input type="checkbox"/> Twice
<input type="checkbox"/> 3 times
<input type="checkbox"/> 4 times
<input type="checkbox"/> 5-9 times
<input type="checkbox"/> 10-14 times
<input type="checkbox"/> 15-19 times
<input type="checkbox"/> More than 19 times
<input type="checkbox"/> Not applicable; I have no eligible children.

CIVILIAN MEDICAL CLINIC UTILIZATION

14. Sponsor's utilization of civilian medical facilities for outpatient care during the past 12 months:

<u> </u> Never during the past year	<u> </u> 4 times	<u> </u> More than 19 times
<u> </u> Once	<u> </u> 5-9 times	
<u> </u> Twice	<u> </u> 10-14 times	
<u> </u> 3 times	<u> </u> 15-19 times	

15. Spouse's utilization of civilian medical facilities for outpatient care during the past 12 months:

<u> </u> Never during the past year	<u> </u> 5-9 times
<u> </u> Once	<u> </u> 10-14 times
<u> </u> Twice	<u> </u> 15-19 times
<u> </u> 3 times	<u> </u> More than 19 times
<u> </u> 4 times	<u> </u> Not applicable; I have no spouse

16. Eligible children's combined total number of visits to civilian medical facilities for outpatient care during the past 12 months:

<u> </u> Never during the past year
<u> </u> Once
<u> </u> Twice
<u> </u> 3 times
<u> </u> 4 times
<u> </u> 5-9 times
<u> </u> 10-14 times
<u> </u> 15-19 times
<u> </u> More than 19 times
<u> </u> Not applicable; I have no eligible children.

WHAT HAS BEEN SPOUSE'S SATISFACTION
IN TERMS OF:

- [illegible]

19. The following space is for you to make any further comments you desire:

PLEASE RETURN THIS COMPLETED QUESTIONNAIRE BY THE INDICATED DATE. YOU MAY
USE THE ENCLOSED ENVELOPE OR BRING IT PERSONALLY TO:

THANK YOU FOR YOUR COOPERATION.

BASELINE CODING SHEET

----- Sponsor's SSAN

----- Marital Status
 1 Never Married 3 Divorced 5 Separated
 2 Married 4 Widowed

----- Pay Grade
 11 E-1 16 E-6 21 WO-1 31 O-1 36 O-6
 12 E-2 17 E-7 22 CWO-2 32 O-2 37 O-7
 13 E-3 18 E-8 23 CWO-3 33 O-3 38 O-8
 14 E-4 19 E-9 24 CWO-4 34 O-4 39 O-9
 15 E-5 35 O-5

----- Branch of Service
 1 USA 3 USAF 5 USCG
 2 USN 4 USMC 6 Other

----- Sponsor's Year of Birth

----- Sponsor's Sex: 1 Male 2 Female

----- Military Status: 1 Active Duty 2 Retired 3 Deceased

----- Number of Children

----- Number of Other Dependents

----- Estimated Month and Year of Departure from Ft Ord

----- City of Residence
 11 Ft Ord 14 Pacific Gr. 17 Carmel Val. 20 Watsonville
 12 Monterey 15 Marina 18 Pebble Bea. 21 Castroville
 13 Seaside 16 Carmel 19 Salinas 22 Other

----- Spouse's Sex: 1 Male 2 Female

----- Spouse's Year of Birth

----- Number of Dependents in the Ft Ord Area

----- Sponsor's Race
 11 White 14 Puerto Rican 17 Japanese Am.
 12 Black 15 Am. Indian 18 None of the Above
 13 Mex-Am 16 Chinese Am.

----- Sponsor's Religion
 11 Protestant 13 Jewish 15 None
 12 Catholic 14 Other

----- Sponsor's Education
 11 8 yrs or less 15 Associate Deg. 19 Masters Degree
 12 Some H S. 16 More than 2 yrs coll. 20 Doctorate
 13 H S Graduate 17 Bachelors Degree
 14 2 yrs college 18 LLB, JD

----- Sponsor's Months at Ft Ord
 11 0-2 mos 14 9-11 mos 17 18-20 mos 20 27-29 mos
 12 3-5 mos 15 12-14 mos 18 21-23 mos 21 more than 30 mos
 13 6-8 mos 16 15-17 mos 19 24-26 mos

----- Sponsor's Total Military Service
 11 < 6 mos 15 > 8 yrs, < 12 yrs
 12 > 6 mos, < 2 yrs 16 > 12 yrs, < 16 yrs
 13 > 2 yrs, < 4 yrs 17 > 16 yrs, < 20 yrs
 14 > 4 yrs, < 8 yrs 18 More than 20 yrs

----- Military Career
 11 Definitely NO 14 Probably YES
 12 Probably NO 15 Definitely YES
 13 Undecided 16 Not Applicable

MF 10:55(Q1), 6 Aug 73



BASELINE CODING SHEET (page 2)

<u>Spouse's Education</u>		
11 8 yrs or less	15 Associate Deg.	19 Masters Degree
12 Some H.S.	16 More than 2 yrs college	20 Doctorate
13 H S Graduate	17 Bachelors Degree	
14 2 yrs college	18 LLB, JD	
<u>Spouse's Race</u>		
11 White	14 Puerto Rican	17 Japanese American
12 Black	15 Am. Indian	18 None of the Above
13 Mex-Am	16 Chinese-Am.	
<u>Spouse's Religion</u>		
11 Protestant	13 Jewish	15 None
12 Catholic	14 Other	
<u>Sponsor's Utilization of Army Clinics</u>		
11 Never	14 3 times	17 10-14 times
12 Once	15 4 times	18 15-19 times
13 Twice	16 5-9 times	19 More than 19 times
<u>Spouse's Utilization of Army Clinics</u>		
11 Never	14 3 times	17 10-14 times
12 Once	15 4 times	18 15-19 times
13 Twice	16 5-9 times	19 More than 19 times
		20 Not Applicable
<u>Eligible Children's Visits to Army Clinics</u>		
<u>Sponsor's Utilization of Civilian Medical Facilities</u>		
<u>Spouse's Utilization of Civilian Medical Facilities</u>		
<u>Eligible Children's Total Visits to Civilian Medical Facilities</u>		
<u>Code for Other Dependent</u>		
40 Mother	50 Mother-in-Law	60 Other
45 Father	55 Father-in-Law	
<u>Sex of Other Dependent</u>		
1 Male	2 Female	
<u>Other Dependents Year of Birth</u>		
<u>Child's Sex:</u> 1 Male	2 Female	<u>6th Child's Sex</u>
<u>1st Child's Year of Birth</u>		<u>6th Child's Year of Birth</u>
<u>2nd Child's Sex</u>		<u>7th Child's Sex</u>
<u>2nd Child's Year of Birth</u>		<u>7th Child's Year of Birth</u>
<u>3rd Child's Sex</u>		<u>8th Child's Sex</u>
<u>3rd Child's Year of Birth</u>		<u>8th Child's Year of Birth</u>
<u>4th Child's Sex</u>		<u>9th Child's Sex</u>
<u>4th Child's Year of Birth</u>		<u>9th Child's Year of Birth</u>
<u>5th Child's Sex</u>		<u>10th Child's Sex</u>
<u>5th Child's Year of Birth</u>		<u>10th Child's Year of Birth</u>

APPENDIX B

This appendix contains all the forms used in the collection of Encounter data. The first form is the encounter form which was filled out on every patient seen by the receptionist and the attending physician(pp 56 - 57). The second form lists all omission codes for the first nine items on the encounter form(pp 58). The last three forms are comprehensive lists of all Xrays, (pp 59 - 62) Laboratory tests, (pp 63 - 76) and Immunizations(p 77) in that order.

HEALTH CARE STUDIES UNIT
NORTH FAMILY PRACTICE CLINIC

1. Date _____

2. Patient's Name _____

3. Sponsor's SSAN(with patient's prefix):

--	--

--	--	--	--	--

--	--

--	--

4. Appointment Status:

(20)Emergency

(21)Appointment

(22)Walk-in

5. Type of Clinic Visit:

(25)Regular Clinic
(morn. or aft.)

(26)Special Clinic
(evening or Saturday)

(27)Non-clinic
(night or holiday)

6. Health Care Provider(name or #): _____

7. Patient's Complaint _____

8. PROVIDER TIME ON PROBLEM
- | Most Time | Second Most |
|---|-------------|
| (160)Acute injury..... | (180) |
| (161)Acute injury followup..... | (181) |
| (162)Acute(temporary) problem..... | (182) |
| (163)Acute(temporary) problem f/u.. | (183) |
| (164)Chronic problem, routine..... | (184) |
| (165)Chronic problem flare-up..... | (185) |
| (166)Prenatal & postnatal care..... | (186) |
| (167)Partial exam, well baby,
screening lab, or prev. ed.... | (187) |
| (168)Complete history & physical... | (188) |
| (169)Family planning/Contraception. | (189) |
| (170)Counseling/Advice..... | (190) |
| (171)Immunization..... | (191) |
| (172)Administrative..... | (192) |
| (173)Other..... | (193) |

(22_)PHARMACY: # OF Rx _____

(231) EKG

11. LAB
- | | |
|---|-----------------------|
| (350)SMA-12, Fasting | (360)CBC & Diff. |
| (351)SMA-12, non-fasting | (361)CBC |
| (352)Chol & Trigly | (362)Hct. |
| (353)Electrolytes | (363)Sickle Cell |
| (354)Glucose, Fasting | (370)G6PD |
| (355)Glucose, ___hr. pp | (364)Urinalysis |
| (356)Glucose 2 hr. p high
sugar meal | (365)Clean catch UA. |
| (357)RPR | (366)Urine culture |
| (358)Mononucl. | (367)Throat culture |
| (359)Rubella titer | (368)Cervical culture |
| | (369)PAP |

Other _____

13. REFER TO:
- | | |
|-----------------------|--------------------|
| (700)Dental | (709)Ophthalmology |
| (701)Dermatology | (710)Optometry |
| (702)ENT | (711)Orthopedics |
| (703)Internal Med. | (712)Pediatrics |
| (704)Ment Hyg/Soc WK. | (713)Psychiatry |
| (705)Neurology | (714)Surgery |
| (706)OB-GYN | (715)Urology |
| (707)OT/PT | |
- Other _____

9. LENGTH OF THIS VISIT

- (210) 0 - 5 min.
(211) 5 - 20 min.
(212) 20 - 40 min.
(213) Over 40 min.

10. X-RAY
(240)Chest-P.A.
(241)Chest-P.A. & Lat.

Other _____

OTHER NURSING CARE _____

12. IMMUNIZATIONS

- | | |
|-------------|----------------------|
| (610)OPV | (615)MMR |
| (611)DPT | (616)Measles & Rubel |
| (612)DT | (617)Mumps |
| (613)T. Tox | (618)Flu |
| (614)Tine | (619)Smallpox |

Other _____

NEXT APPOINTMENT

15 min. _____

30 min. _____

45 min. _____

60 min. _____

30 min. _____

30 min with Nurse Clin _____

P.E. with Nurse Clin _____

Other _____

• NO APPT. STATUS.	24
NO TYPE CL. VISIT	29
NO H.C. PROVIDER	150
NO <u>MOST TIME</u>	179
NO LENGTH OF VISIT	219
NO DISEASE CATEGORY	999

RADIOLOGY

- 242 abdominal series - abdomes, flat and upright
- 268 abdomes, flat
- 243 ankle
- 262 arm
- 244 arteriogram - aortogram
- 245 arteriogram, celiac
- 246 arteriogram, femoral
- 247 arteriogram, hepatic
- 248 arteriogram, internal carotid
- 249 arteriogram, renal
- 250 areteriogram, vertebral
- 251 barium, enema
- 252 bone scan
- 253 cardiac scan
- 254 cardiac series
- 255 Chest, apical lordotic
- 240 Chest, p-a
- 241 Chest, p-a and lateral
- 254 Chest, p-a and lateral with barium swallow
- 256 coccyx
- 257 elbow
- 276 eye-eye socket
- 258 facial views-face
- 259 femur
- 260 fetal age
- 269 fibula

281 finger
261 foot
262 forearm
263 gall bladder series
264 hand
277 heel
265 hip
266 humerus
267 internal auditory canal
273 jaw
268 KUB-Kidney, ureters, and bladder
269 leg, lower
270 liver-spleen scan
271 lung perfusion study
272 lung ventilation study
243 malleolus, lateral or medial
273 mandible
274 mastoid
291 neck
275 nose
276 orbit
277 os calcis
278 pancreatic scan
279 patella
280 pelvis
281 phalanges-phalanx
302 phlebogram

282 placental localization--placentogram
262 radius
249 renogram
283 red cell mass--rbc mass
284 rib-ribs
285 sacrum
286 schilling test
287 shoulder
288 sialogram
289 sinus-sinuses
290 skull series
291 spine, cervical
292 spine, lumbo-sacral-l-s spine
293 spine, thoracic
270 spleen scan
294 temporo-mandibular Joints-tm joints
295 thyroed scan
269 tibia
281 toe
296 tomograms, chest
297 tomograms, kidney
298 tomograms, skull-head, brain
299 tomograms, other
262 ulna
266 upper arm
300 upper g-i series
301- upper g-i with small bowel

302 venogram

303 wrist

304 a-p and lateral, part not listed- p-a and lateral

CODE NUMBERS FOR LAB.

587	ABO group and type
545	Acid mucopolysaccharides, 24 hr. urine
372	Activated partial thromboplastin time--PTT
373	Acetone
420	AFB culture acid fast bacilli culture
374	AFB sensitivity
375	AFB smear
494	Acid phosphatase
376	Agglutination
377	Aigratio
377	Albumin, serum
576	Albumin, 24 hr. urine
594	Albumin, urine
378	Alcohol, Blood
379	Aldolase
546	Aldosterone, 24 hr. urine
495	Alkaline phosphatase (blood)
380	Amino acid screen
548	Amino acids, 24 hr. urine
434	d-Aminolevulinic acid
381	Amylase
547	Amylase, 24 hr. urine
382	Amniotic fluid screen
383	Andibody identification
384	Antibody screen, prenatal
385	ANF, ANA Antinuclear antibody, antinuclear factor
386	ASO, Antistreptolysin-O

387	Arsenic
462	Australian antigen
388	Barbiturates
389	Bence-Jones protein
390	Bilirubin, direct and/or indirect
391	Bilirubin, total (blood)
593	Bilirubin, urine; bile, urine
549	Bismuth, 24 hr. urine
392	Bleeding time
393	Blood gases
587	Blood group and type
355	Blood sugar
354	Blood sugar, fasting
587	Blood type and group
394	BUN, Blood urea nitrogen
395	Bone marrow smear
396	BSP, Bromsulfothalein
397	Cadmium
398	Cadmium, 24 hr. urine
399	Ca, Calcium, Blood
400	Calcium, urine
551	Calcium, 24 hr. urine
401	CO ₂ , Carbon dioxide, total
492	pCO ₂ Carbon dioxide pressure
402	Carotene
552	Catecholamines, 24 hr. urine
361	CBC, complete blood count
360	CBC and diff, complete and differential blood count

600	Cell count, white blood
423	Cell count, spinal fluid
497	Cellophane tape
404	Ceruloplasmin
405	Cl; Chloride
406	Cholesterol
352	Cholesterol and triglycerides
407	Cholinesterase
553	Chorionic gonadotropins, 24 hr. urine
408	Clot Retraction
401	CO ₂ , total, serum
409	Cold agglutins
524	Colloidal gold, spinal fluid
591	Colony count, urine
410	Complement, serum; C ₃
411	Complement fixation
412	Concentration test, urine
413	Coombs, direct
414	Coombs, indirect
415	Copper, serum
554	Copper, 24 hr. urine
555	Coproporphyrins, 24 hr. urine
416	Cortisol
417	C-reactive protein, CRP
418	Creatinine
419	CPK, Creatinine phosphokinase
556	Creatinine and creatine, 24 hr. urine

586	Crossmatch
420	Culture, acid fast bacilli--AFB
368	Culture, cervical
421	Culture, fungal
368	Culture, gonorrhea--G.C. culture
422	Culture, spinal fluid
423	Culture, sputum
424	Culture, stool
367	Culture, throat
420	Culture, tuberculosis
366	Culture, urine, and colony count
425	Culture, viral
426	Culture, other
427	Cytology, biopsy
369	Cytology, cervical
428	Cytology, endometrial washings
429	Cytology, gastric washings
430	Cytology, nipple secretions
431	Cytology, sputum
432	Cytology, Urine
433	Cytology, other
603	Cytology, surgical specimen
434	d-Aminolevulinic acid
435	Dark field
436	Differential white count
413	Direct Coombs
437	Donatch Landsteiner
353	Electrolytes, serum, blood

557	Electrolytes, 24 hr. urine
558	Electrophoresis, 24 hr. urine
438	Eosinophile count, blood
439	Eosinophile count, nasal smear
440	ESR: Erythrocyte sedimentation rate
559	Esteriol, 24 hr. urine
441	Estrogen level (vaginal smear)
354	FBS
468	Fe, Iron
469	Fe binding
442	Febrile agglutination
443	Ferrohemoglin solubility
444	5 HIAA; 5-hydroxy-indole-acetic acid
560	5 HIAA; 5-hydroxy-indole-acetic acid, 24 hr. urine
445	5'-nucleotidase
446	FTA-ABS, Flourescent treponema antibody, absorbed
447	Folic acid
561	FSH, 24 hr. urine
421	Fungus culture
448	Fungus smear, slide, Hanging drop
370	G6PD; glucose 6 phosphate dehydrogenase screen
449	Genotype
377	Globulin
355	Glucose, blood
354	Glucose, fasting
525	Glucose, spinal fluid
451	Glucose toletance test
355	Glucose, post-prandial

356	Glucose, 2 hr. post special meal
593	Glucose, urine
562	Glucose, 24 hr. urine
517	Glutamic oxalacetic transaminase, serum; SGOT
452	Gram stain
453	Gravindex
587	Group, blood, and type
454	Haptoglobin
362	Hct.--Hematocrit
359	HAI, Hemagglutination inhibition
456	Hemoglobin, alkali resistant
457	Hb, Hgb., Hemoglobin, blood
458	Hb, plasma
459	Hb., electrophoresis
460	Hb., heat unstable
461	Hemosiderinuria, hemosiderin
462	Hepatitis antigen
463	Homogentisic acid
464	H-prep
465	Ictotest
526	India ink, spinal fluid
361	Indicies--red cell indicies
414	Indirect Coombs
564	Indole-3-acetic acid, 24 hr. urine
358	Infections mononucleosis
466	Insulin
467	PBI, iodide, plasma bound

468	Iron
469	IBC, Iron-binding capacity
565	Iron, 24 hr. urine
502	K, potassium
448	KOH prep., potassium hypoxide prep.
470	Lactic acid
471	LDH, Lactic dehydrogenase
472	LDH, isoenzymes
513	Latex fixation
473	Lead, serum or blood
566	Lead, 24 hr. urine
474	Lead, urine
475	L/S shake test--Lecithin-syringomyelin shake test
476	L/S ratio
477	Leucine aminopeptidase
478	Leukocyte alkaline phosphatase
479	Lipase
352	Lipid screen
480	Lipoprotein electrophoresis
481	Lithium
385	Lupus test
482	Mg-Magnesium, serum
567	Mg-, 24 hr. urine
483	Malaria smear
361	MCH-mean corpuscular hemoglob6n
361	MCV--Mean corpuscular volume
484	Melanin
484	Melanogen

568 Mercury, 24 hr. urine
 485 Methemoglobin
 358 Monospot, mononucleosis
 436 Morphology, red cell
 545 Mucopolysaccharides, acid, 24 hr. urine
 411 Mycoses complement fixation
 486 Myoglobin
 439 Nasal smear for eosinophils
 445 5'nucleotidase
 487 Osmolality
 488 Osmotic fragility
 537 Ova and parasites, stool
 489 Ova and parasites, other
 499 Oxygen, blood
 369 Pap smear; Papinicolaou smear
 490 Paroxysmal nocturnal hemoglobinuria
 491 PTT--Partial thromboplastin time, activated
 Pathology- see cytology
 566 Pb, 24 hr. urine
 467 PBI, plasma bound iodide
 492 pCO₂
 493 Phenylalanine, serum
 494 Phosphatase, acid
 495 Phosphatase, alkaline
 496 PO₄, phosphate, serum
 497 Pinworms
 498 Platelet count
 467 PBI, plasma bound iodide
 499 pO₂

571 P, phosphous, 24 hr. urine
 500 Porphobilinogen
 572 Porphobilinogen, 24 hr. urine
 501 Pophyrin, screening
 573 Porphyrins, 24 hr. urine
 502 Potassium, K.
 503 KOH, prep--Potassium hydroxide prep.
 504 Pregnancy
 574 Pregnanediol, 24 hr. urine
 575 Pregnanetriol, 24 hr. urine
 455 Prenatal antibody screen
 505 Progesterone
 535 Protein, serum
 506 Protein electrophoresis
 527 Protein, spinal fluid
 576 Protein, albumin 24 hr. urine
 507 Protein, total
 508 PT, Prothrombin time
 509 Protoporphyrin and uroporphyrine
 569 PSP;Phenolsultonphthalein 24 hr. urine
 510 Pyroglobulins
 511 RBC, Red blood cell count, red cell count,
 357 RPR, reiter protein reaction
 512 Retic. count, reticulocyte count
 513 RA. rheumatoid arthritis factor, latex fixation
 514 Rh phenotype
 515 Rh Titer, Rhesus titer
 359 Rubella screen rubella titer
 516 Salicylate level

- 497 Scotch tape test (pinworms)
- 440 Sedimentation rate; sed. rate; ESR
- 560 Serotonin, 24 hr. urine
- 517 SGOT, serum glutamic oxalacetic transaminase
- 518 17-OH steroids, seventeen hydroxy-steroids, 24 hr. urine
- 519 17 Keto-steroid, 24 hr. urine
- 520 Siderocytes
- 350 SMA-12, fasting
- 351 SMA-12, non-fasting
- 375 Smear AFB
- 436 Smear blood
- 448 Smear, Fungal
- 521 Sodium
- 522 Sperm analysis, sperm count

Spinal Fluid

- 523 Cell count
- 524 Colloidal gold
- 422 Culture
- 525 Glucose
- 526 India ink
- 527 Protein
- 528 VDRL

Stool

- 529 Blood, gross
- 530 Blood, occult
- 531 Color
- 532 Consistency
- 533 Fat qualitative

Stool

534 Fat, Quantitative

536 Mucus

537 Ova and parasites

538 Sugar water test

541 TA, thyroid antibody

539 Testosterone

540 Thallium

579 Thallium, 24 hr. urine

367 Throat culture

541 TA, Thyroid antibody

542 TBG, Thyroid binding globulin

374 T3 and T4

543 TSH and LATS, thyroid stimulating hormone and long-acting thyroid stimulating hormone

469 TIBC, total iron binding capacity

517 Transaminase, SGOT

544 Triglycerides

24 hr. urine for

545 Acid mucopolysaccharides, 24 hr. urine

576 Albumin, 24 hr. urine

546 Aldosterone, 24 hr. urine

547 Amylase, 24 hr. urine

548 Amino acids, 24 urine

549 Bismuth, Bi, 24 hr. urine

550 Cadmium, Cd 24 hr. urine

551 Calcium, Ca, 24 hr. urine

552 Catecholamines, 24 hr. urine

553 Chorionic gonadotropins, 24 hr. urine

554 Copper, Cu 24 hr. urine

24 hr. urine

- 555 Coproporphyrins 24 hr. urine
- 556 Creatinine and creatine, 24 hr. urine
- 557 Electrolytes, 24 hr. urine
- 558 Electrophoresis, 24 hr. urine
- 559 Esteriol, 24 hr. urine
- 565 Fe, 24 hr. urine
- 560 5HIAA, 5,-hydroxy-indoleacetic acid, 24 hr. urine
- 561 FSH, follicle stimulating hormone, 24 hr. urine
- 562 Glucose, 24 hr. urine
- 568 Hg, 24 hr. urine
- 563 Heavy metals, 24 hr. urine
- 564 Indole-3-acetic acid, 24 hr. urine
- 565 Iron, Fe, 24 hr. urine
- 566 Lead, Pb- 24 hr. urine
- 567 Magnesium, Mg, 24 hr. urine
- 568 Mercury, Hg, 24 hr. urine
- 566 Pb, 24 hr. urine
- 569 PSP, phenolsulfonthalein, 24 hr. urine
- 570 Phenylalanine, 24 hr. urine
- 571 PO₄, phosphate, 24 hr. urine
- 571 P, Phosphorus, 24 hr. urine
- 572 Porphobilinogen, 24 hr. urine
- 573 Porphyrins, 24 hr. urine
- 574 Pregnanediol, 24 hr. urine
- 575 Pregnantriol, 24 hr. urine
- 576 Protein, albumin (quant.), 24 hr. urine
- 560 Serotonin, 24 hr. urine

24 hr. urine for

- 577 17-OH Corticoids, 17-Hydroxy cortico steroids, 24 hr. urin
- 578 17KS, 17-Keto-steroids, 24 hr. urine
- 579 Thallium, 24 hr. urine
- 580 Urea nitrogen, 24 hr. urine
- 581 Uric acid, 24 hr. urine
- 582 Urobilinogen, 24 hr. urine
- 583 Uroporphyrins, 24 hr. urine
- 584 VMA, vanilmandelic acid, 24 hr. urine
- 585 Zinc, 24 hr. urine

- 586 Type and cross match,
- 587 Type and group
- 588 Urea nitrogen, BUN
- 580 Urea nitrogen, 24 hr. urine
- 589 Urethral Smear
- 589 Urethral Smear
- 590 Uric acid
- 581 Uric acid, 24 hr. urine
- 364 Urinalysis
- 365 Urinalysis, clean catch
- 594 Urine, Albumin
- 591 Urine colony count
- 592 Urine concentration test
- 366 urine culture
- 593 Urine dipstick
- 594 Urine protein, qualitative
- 576 Urine protein, 24 hr.
- 364 Urine sediment

595	Urobilinogen, urine
582	Urobilinogen, 24 hr. urine
583	Uroporphyrins, 24 hr. urine
509	Uroporphyrin and protoporphyrin
596	VDRL, Venereal Disease research Lab.
528	VDRL, spinal fluid
425	Viral culture
597	Vitamin A.
598	Vitamin B12
599	VMA-Vanilmandelic Acid, 24 hr. urine
600	WBC, white blood count, white cell count
601	Weil-Felix
602	Zinc
584	Zinc, 24 hr. urine

Tests

IMMUNIZATIONS

- 640 First strength PPD (Purified protein derivative)
- 641 Intermediate strength PPD or Aplisol
- 642 Second Strength PPD
- 643 Blastomycosis, Blasto
- 644 Coccidioidin, coccidiomycosis, cocci
- 645 Histoplasmin, histomycosis, histo
- 646 Dick test (for scarlet fever)
- 647 Frei Test (for L-G-V, lympho-granuloma venereum)
- 648 Mumps
- 649 Schick (for diphtheria)

IMMUNIZATIONS

- 620 adenovirus
- 621 BCG-bacillus Calmette-Guerin
- 622 cholera
- 623 diphtheria
- 624 measles
- 625 typhoid
- 626 typhus
- 627 rabies-pasteur treatment
- 628 rubella
- 629 yellow fever

5 1051

APPENDIX C

This appendix contains those computer programs used most frequently in the data collection effort. The first program was used to compile a sequential listing of all patients enrolled in the family practice program. Program two was used to read the data from encounter sheets onto the data cell in a format compatible with the SPSS programs. Program three and four are the SPSS programs used to produce summary statistics on the collected encounter data.

THIS PROGRAM WILL PROVIDE A SEQUENTIAL LISTING
 OF ALL PATIENTS ENROLLED IN THE FAMILY PRACTICE
 PROGRAM. THIS PROGRAM IS WRITTEN IN DOUBLE PRECISION.

```
// EXEC FORTCLG,REGION.GO=200K
//FORT.SYSIN DD DSN=SSP3(DSSORT),DISP=SHR
// DD *
      DIMENSION ISSN(1700),IPG(1700),ISTA(1700),ICOD(1700,12),KEY(1700)
      REAL*8 ISSN
      READ(5,151)LIM
      FORMAT(14)
      NIM=LIM+10
      DO 7000 I=1,NIM
        KEY(I)=I
        CONTINUE
      ICNT=0
      INT20=0
      INT30=0
      ICNT=0
      DO 20 I=1,1700
        ISSN(I)=0
        IPG(I)=0
        ISTA(I)=0
        DO 30 J=1,12
          ICOD(I,J)=0
        CONTINUE
      DO 100 I=1,LIM
        READ(5,150)ISSN(I),IPG(I),ISTA(I),ICOD(I,1),ICOD(I,2),ICOD(I,3),
        1ICOD(I,4),ICOD(I,5),ICOD(I,6),ICOD(I,7),ICOD(I,8),ICOD(I,9),
        2ICOD(I,10),ICOD(I,11),ICOD(I,12)
        FORMAT(2X,F9.0,14(I3))
      CONTINUE
      N=LIM
      CALL DSSORT(ISSN,KEY,N)
      DO 200 I=1,LIM,5
        J=I+1
        L=I+2
        M=I+3
        N=I+4
        WRITE(6,1550)ISSN(I),IPG(KEY(I)),ISTA(KEY(I)),ICOD(KEY(I),J),
        1ISSN(L),IPG(KEY(L)),ISTA(KEY(L)),ICOD(KEY(L),J),ISSN(M),IPG(KEY(M
        2)),ISTA(KEY(M)),ICOD(KEY(M),J),ISSN(K),IPG(KEY(K)),ISTA(KEY(K)),

```



```

3 ICOD(KEY(K),J),ISSN(N),IPG(KEY(N)),ISTA(KEY(N)),ICOD(KEY(N),J)
1550 FORMAT(0,5(F14.0,3(I4)))
DO 300 JJ=2,12
  IF(ICOD(KEY(L),JJ).GT.0)GO TO 400
  IF(ICOD(KEY(I),JJ).GT.0)GO TO 400
  IF(ICOD(KEY(M),JJ).GT.0)GO TO 400
  IF(ICOD(KEY(K),JJ).GT.0)GO TO 400
  IF(ICOD(KEY(N),JJ).GT.0)GO TO 400
GO TO 200
400 WRITE(6,1560)ICOD(KEY(I),JJ),ICOD(KEY(L),JJ),ICOD(KEY(M),JJ),
1560 ICOD(KEY(K),JJ),ICOD(KEY(N),JJ)
300 FORMAT(15X,I12,4(I4X,I12))
200 CONTINUE
DO 201 I=1,LIM
  IF(ICOD(I,J).EQ.0)GO TO 201
  ICNT=ICNT+1
  IF(ICOD(I,J).EQ.20) GO TO 15
  IF(ICOD(I,J).EQ.30) GO TO 16
  IF(ICOD(I,J).GT.31) GO TO 17
  IF(ICOD(I,J).LT.19) GO TO 18
  INT20=INT20+1
GO TO 301
15 INT30=INT30+1
GO TO 301
16 INT30=INT30+1
GO TO 301
17 ICNT=ICNT+1
GO TO 301
18 KCNT=KCNT+1
301 CONTINUE
201 CONTINUE
550 WRITE(6,550)ICNT
550 FORMAT(15X,'TOTAL
551 WRITE(6,551)INT20
551 FORMAT(15X,'TOTAL
552 WRITE(6,552)INT30
552 FORMAT(15X,'TOTAL
554 WRITE(6,554)KCNT
554 FORMAT(15X,'TOTAL
553 WRITE(6,553)ICNT
553 FORMAT(15X,'TOTAL
STOP
END
//GO.SYSIN DD *

```


THIS PROGRAM WILL PROPERLY FORMAT AND READ ONTO THE DATA CELL DATA PUNCHED ONTO IBM CARDS FROM THE ENCOUNTER SHEETS. THIS FORMAT IS COMPATIBLE WITH THE SPSS ROUTINES.

```
// EXEC FORTCLG,REGION.GO=150K
//FORT.SYSIN DD *
DIMENSION DD IVAR(20),XRAY(10),LAB(10),REF(10),DIAG(10)
INTEGER VAR(20),XRAY,REF,DIAG,EKG,PHAR
REAL*8 SSN,SSN2,SS22,CODE
ICNT=0
LCNT=0
IDCT=0
ICN2=0
5000 READ(5,1002)IDATE,CODE,SSN2,(VAR(I),I=1,20)
1002 FORMAT(I6,F2.2,F9.0,2I2,18I3)
DO 102 I=1,10
XRAY(I)=0
DIAG(I)=0
REF(I)=0
LAB(I)=0
102 CONTINUE
IF(SSN2.EQ.0)GO TO 25
EKG=0
PHAR=0
J=0
K=0
L=0
M=0
501 DO 100 I=7,20
IF(VAR(I).EQ.0)GO TO 2000
IF(VAR(I).EQ.231)GO TO 401
IF(VAR(I).LT.240)GO TO 406
IF(VAR(I).LT.350)GO TO 402
IF(VAR(I).LT.600)GO TO 403
IF(VAR(I).LT.700)GO TO 405
IF(VAR(I).LT.1000)GO TO 404
PHAR=VAR(I)
GO TO 100
406 GO TO 100
402 J=J+1
XRAY(J)=VAR(I)
GO TO 100
403 K=K+1
LAB(K)=VAR(I)
GO TO 100
```



```

404 L=L+1
    REF(L)=VAR(I)
    GO TO 100
405 M=M+1
    DIAG(M)=VAR(I)
    GO TO 100
401 EKG=VAR(I)
100 CONTINUE
2000 WRITE(3,1550)IDATE,SS22,(VAR(I),I=1,6),XRAY(1),
1550 1PHAR,EKG,LAB(1),REF(1),DIAG(1)
    FORMAT(16,F12.2,2I2,10I3)
    ICNT=ICNT+1
    DO 666 L=2,10
    IF(XRAY(L).GT.0)GO TO 980
    IF(LAB(L).GT.0)GO TO 980
    IF(REF(L).GT.0)GO TO 980
    IF(DIAG(L).GT.0)GO TO 980
    GO TO 5000
980 WRITE(3,1457)IDATE,(VAR(I),I=1,6),XRAY(L),LAB(L),REF(
1457 1L),DIAG(L)
    FORMAT(16,12X,2I2,5I3,6X,3I3)
666 ICNT2=ICNT2+1
    CONTINUE
    GO TO 5000
25 WRITE(6,787)ICNT
787 FORMAT(10X,'TOTAL PATIENT COUNT + ENTRY ON DATA IS',
115)
    WRITE(6,888)LCNT
888 FORMAT(30X,'ILLEGAL PATIENT COUNT=',I4)
    ICNT=ICNT+ICNT2
    WRITE(6,923)ITOT
923 FORMAT(30X,'TOTAL TREATMENT COUNT IS ',I4)
    STOP
    END
//GO.FT03F001 DD UNIT=2321,VOLUME=SER=CEL007,
// DISP=(NEW,KEEP),LABEL=EXPDT=74300,
// SPACE=(CYL,20,RLSE),
// DCB=(RECFM=FB,LRECL=55,BLKSIZE=1540),
// DSN=ME=S1042.NFCJAN
//GC.SYSIN DD *

```


THIS IS THE SPSS PROGRAM USED TO GENERATE SUMMARY
STATISTICS OF THE FOLLOWING ITEMS ; DATE, APPOINTMENT
STATUS, TYPE OF VISIT, DOCTOR SEEN, PROBLEM REQUIRING
MOST TIME, PROBLEM REQUIRING SECOND MOST TIME, AND
LENGTH OF VISIT.

```
// EXEC SPSS, PARM=30000, REGION=220K
// FTO8F001 DD UNIT=2321, VOLUME=SER=CEL007,
// DISP=(OLD,KEEP), LABEL=(,,IN),
// DSN=NAME=S1042.NFCJAN
//SYSDO *
RUN NAME
FILE NAME
VARIABLE LIST
VAR LABELS

VALUE LABELS

NFO CLINIC DATA JAN TROU APRIL
ENCOUNTER
DATE,MN,SS,AS,TV,DS,MT,SMT,LV,RX,EKG
AS,APPOINTMENT STATUS/TV,TYPE VISIT/DS,DOC SEEN/
MT,PROBLEM REQUIRING MOST TIME/SMT,PROB REQUIRING 2D MOST TIME/
LV,LENGTH OF VISIT
DS,(000)UNASSIGNED(101)WOODLUFF(102)MARTIN(103)DEITCHMAN
(104)ESCHEN(109)BRYANT(110)RN(111)CORPSMAN(112)PA(115)CHAFFEE
(116)FORRE(117)GOCCH(118)GODDARD(119)LEWIS(120)MEADOWS(121)
WATKINS(127)WEIGAND(130)CAMBELL(131)RN(132)CORPSMAN(133)PA/
AS (20)EMERGENCY(21)APPOINTMENT(22)WALK IN/
TV (25)DUTY HOURS(26)SPECIAL(27)NONCLINIC/
MT (160)ACUTE INJURY(161)ACUTE INJ FOLLOWUP(162) ACUTE TEMP
PROB(163)ACU TEMP OR POSTNAT(164)CHRONIC RCUTINE(165)CHRONIC
FLAREUP(166)PRE OR POSTNAT(167)P EXAM,W BABY,P MED(168)HIST
,PHYSICAL(169)FMYPLNG,CONTRACEP(170)ADVICE,COUNSEL(171)IMMUNIZ
(172)ADMINISTRATIVE(173)OTHER/
SMT (180)ACUTE INJURY(181)ACUTE INJ FOLLOWUP(182)ACUTE TEMP
PROB(183)ACU TEMP OR POSTNAT(184)CHRONIC RCUTINE(185)C8ROE13
FLAREUP(186)PRE OR POSTNAT(187)EXAM,W BABY,P MED(188)HIST
,PHYSICAL(189)FMY PLNG,CONTRACEP(190)ADVICE,COUNSEL(191)IMMUNIZ
LV (210)0-5 MIN(211)5-20 MIN(212)20-40 MIN(213)OVER 40 MIN/
OTHER
FIXED(F2.0,F2.0,2X,F12.2,2F2.0,4F3.0,3X,2F3.0)
DATE,AS TO LV (0)
(MN, EQ 4 AND SS NE 0 AND DS EQ 104)
6290
# OF CASES
CODEBOOK
READ INPUT DATA
FINISH
DATE,AS TO LV,RX,EKG
```


THIS IS THE SPSS PROGRAM USED TO GENERATE SUMMARY
STATISTICS OF THE FOLLOWING ITEMS DATE, DOCTOR, X-RAYS,
LABS, REFERRALS, AND IMMUNIZATIONS.

```
// EXEC SPSS, PARM=30000, REGION=220K
// FT08F001 DD UNIT=2321, VOLUME=SER=CEL007,
// DISP=(OLD, KEEP), LABEL=(, , IN),
// DSN=SI042.NF.CJAN
//SYSIN DD *
RUN NAME
FILE NAME
VARIABLE LIST
VAR LABELS
VALUE LABELS

TREATMENT DATA NFD JAN THRU APRIL
ENCCOUNTER
DA, DOC, X, L, R, D
X, XRAY, TYPE/L, LAB, TEST/
R, REFERRAL CLINIC/D, IMMUNIZATION
X (240) CHEST PA (241) CHEST PA LAT/
L (350) SMA-12 (351) SMA-12 N.F. (352) CHOL + TRIG
(353) ELECTRO (354) GLUC (355) GLUC XHR PP (356) GLUC 2HR
(357) RPR (358) MONO (359) RUBE TITER (360) CBC + DIFF (361) CBC
(362) HCT (363) SICK CELL (370) GGD (364) URIN (365) CL CATCH
(366) UR CULTURE (367) THROAT CULT (368) CERT CULTURE (369) PAP/
R (700) DENTAL (701) DERMAT (702) ENT (703) INT MED (704) MENT HYG
(705) NEUROLOGY (706) OB-GYN (707) DT-PT (709) OPHTHAM (710) OPTOMETRY
(711) ORTHOPEDICS (712) PEDIATRICS (713) PSYCH (714) SURGERY
D (715) UROLOGY/
(610) OPV (611) DPT (612) DT (613) T. TOX (614) TINE (615) MMR
(616) MEAS + RUB (617) MUMPS (618) FLU (619) SMALL POX/
FIXED (2X, F2.0, 18X, F3.0, 9X, F3.0, 6X, 3F3.0)

INPUT FORMAT
MISSING VALUES
INPUT MEDIUM
SELECT IF
PRINT FORMATS
# OF CASES
CODEBOOK
READ INPUT DATA
FINISH
```


NOTES AND REFERENCES

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ambulatory care facil-
ity.

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